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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/501,737

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EXAMINER

GERIDO, DWAN A

ART UNIT

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1797

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/501,737	Applicant(s) KANNAN ET AL.	
	Examiner Dwan A. Gerido, Ph.D.	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>See Continuation Sheet</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Attachment(s) 3). Information Disclosure Statement(s) (PTO/SB/08), Paper No(s)/Mail Date :7-16-2004, 3-14-2005, 3-27-2007.

DETAILED ACTION

1. Claims 7, 9, and 11 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 7, 9, and 11 are dependant on claim 6, but does not further limit the structure of the device described in claim 6.

2. Claims 9 and 11 are objected to because of the following informalities: as listed, claims 9 and 11 depend from claim 6; however, claims 9 and 11 contain the limitations of independent claim 8 (cleaning means, pollutants). The examiner believes that applicant intends for claims 9 and 11 to depend from claim 8, and has made a minor mistake in claim dependency.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 6, 7, and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Komiyama et al., (US 6,716,477).

5. For claim 1, Komiyama et al., teach a first and second exhaust means (column 10 lines 11-14), an information acquisition means (column 9 lines 15-18), and a control means (column 9 lines 27-34).

6. For claim 6, Komiyama et al., teach a process chamber (figure 23 #510), a gas supply (figure 23 #520), a first and second exhaust means (column 10 lines 11-14), a measuring means located between the first and second exhaust means (column 28 lines 36-43, figure 23 #'s 530, X4), and a control means (column 9 lines 27-34).

7. With regards to claim 7, the device of claim 6 contains all of the embodiments of claim 7; therefore, it would be fully capable of performing the functions of claim 7.

8. With regards to claim 19, Komiyama et al., teach the first exhaust means as a turbo molecular pump, and the second exhaust means as a dry pump (column 10 lines 11-20).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 2-5, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komiyama et al (US 6,716,477).

13. With regards to claim 2, Komiyama et al., teach a first exhaust means connected to a chamber (figure 2 #2b), a second exhaust means connected to the first exhaust means by a pipe (figure 2 #'s 2b and 16), an information acquisition means (column 9 lines 15-18), and a control section (column 9 lines 27-34). Komiyama et al., do not teach the first exhaust section connected to the chamber by an exhaust pipe, nor does he teach the second pipe having a diameter smaller than the first exhaust pipe. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Komiyama et al., with an exhaust pipe connecting the first exhaust means and the chamber in order to gain the advantage of controlling the amount of exhaust gas delivered to the first exhaust means. It also would have been obvious to one of ordinary skill to make the diameter of the second exhaust pipe smaller than the diameter of the first exhaust pipe to gain the advantage of altering the pressure gradient along the tube in order to favor exhaust gas flow into the measuring device.

14. With regards to claim 3, Komiyama et al., teach a connection between the second exhaust pipe and the measuring section (column 28 lines 36-43, figure 23 #'s 530, X4). Komiyama et al., do not explicitly teach the connection with a pipe, however one of ordinary skill in the art at the time the invention was made would have found it obvious to use any connection means capable

Art Unit: 1797

of connecting the structures to gain the advantage of measuring the content of exhaust gases from various sections of the device as taught by Komiyama et al., (column 28 lines 51-58).

15. With regards to claims 4 and 5, Komiyama et al., teach a Fourier-transform infrared spectroscope as the information acquisition means/section (column 9 lines 15-18).

16. With regards to claim 20, Komiyama et al., teach the first exhaust section as a turbo molecular pump and the second exhaust section as a dry pump (column 10 lines 11-20).

17. Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komiyama et al., (US 6,716,477) in view of Kim et al., (US 2003/0185966).

18. With regards to claim 8, Komiyama et al., teach a process chamber (figure 23 #510), a gas supply (figure 23 #520), a first and second exhaust means (column 10 lines 11-14), a measuring means located between the first and second exhaust means (column 28 lines 36-43, figure 23 #'s 530, X4), and a control means (column 9 lines 27-34). Komiyama et al., do not teach a cleaning means as a component of the device. Kim et al., teach a substrate processing chamber with a cleaning means (abstract, paragraph 0048). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Komiyama et al., in view of Kim et al., to gain the advantage of improving chamber performance by preventing or removing accumulation of process residues on the chamber surface as taught by Kim et al.

19. With regards to claim 9, Kim et al., teach a system in which the pollutants are particles (paragraph 0046), and the control means detects multiple signals related to the function of the device (paragraphs 0061-0067). It would have been obvious to one of ordinary skill in the art at the time the invention was made to Komiyama et al., with the control means of Kim et al., to

detect the amount of exhaust gas in the chamber in order to determine whether the cleaning process is required by the chamber.

20. With regards to claim 10, Kim et al., teach the device with a photodiode which reads on the optical counter of the instant claim (paragraph 0061).

21. With regards to claim 11, kim et al., teach a device capable of detecting byproducts of halogen and silicon reactions which reads on the byproduct measuring means of the instant claim (paragraph 0046).

22. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Komiyama et al., (US 6,716,477) as applied to claim 6 above, and further in view of Hinaga (US 5,569,837).

23. With regards to claim 12, Komiyama et al., do not teach a process system in which the information acquisition means has a mass spectrometry device. Hinaga teaches a detector for desorption using a mass spectrometer (column 8 line 40). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Komiyama et al., in view of Hinaga to gain the advantage of measuring desorbed gas with a mass spectrometer in order to reduce the effects of background noise on the gas measurements as taught by Hinaga.

24. Claims 13 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komiyama et al., (US 6716477).

25. With regards to claim 13, Komiyama et al., teach a method of performing a predetermined process on a target inside a chamber comprising main and sub exhaust sections connected to the chamber to create a vacuum pressure (column 10 lines 11-20), an information acquisition means for acquiring information from the exhaust gas (column 9 lines 15-19), and a control means for controlling the process (column 9 lines 27-34). Komiyama et al., do not teach

Art Unit: 1797

acquiring information from exhaust gasses flowing between the main and sub exhaust sections.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Komiyama et al., in a manner where exhaust gasses between the main and sub exhaust sections is sampled in order to measure the content of the exhaust gas from various sections of the device as taught by Komiyama et al (column 28 lines 51-58).

26. With regards to claim 17, Komiyama et al., teach supplying a plurality of process gasses into a chamber and retaining a process target for a predetermined time (column 13 lines 44-56, column 21 lines 5-14).

27. Claims 14-16 rejected under 35 U.S.C. 103(a) as being unpatentable over Komiyama et al., (US 6,716,477).

28. With regards to claim 14, Komiyama et al., teach a method of performing a predetermined process in a chamber retaining a process target comprising a main exhaust section connected to a chamber and a sub exhaust section connected to the main exhaust section via a pipe (column 10 lines 11-20, figure 2 #'s 2b and 16). Komiyama et al., also teach an acquisition means for determining information about the exhaust gas and a controller for controlling the process (column 9 lines 15-19, 27-34). Komiyama et al., do not teach a method in which the main exhaust section is connected to the chamber by an exhaust pipe, nor does he teach the second pipe having a diameter smaller than the first exhaust pipe. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Komiyama et al., with an exhaust pipe connecting the first exhaust means and the chamber in order to gain the advantage of controlling the amount of exhaust gas delivered to the first exhaust means. It also would have been obvious to one of ordinary skill to make the diameter of the second exhaust

pipe smaller than the diameter of the first exhaust pipe to gain the advantage of altering the pressure gradient along the tube in order to favor exhaust gas flow into the measuring device.

29. With regards to claim 15, Komiyama et al., teach a method in which the pressure in the chamber is created by the sub exhaust section (column 10 lines 11-20, figure 2 #16). Komiyama et al., also teach a method in which exhaust gas is sampled from a pipe leading from the sub exhaust section which reads on the information acquisition step where information concerning the exhaust gas from a measurement pipe is ascertained (figure 2 #22). Komiyama et al., do not teach the method where a measurement pipe is located between the main and sub exhaust sections. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Komiyama et al., by adding a measurement pipe between the main and sub exhaust sections in order to record exhaust gas samples from different sections of the process device as taught by Komiyama et al.

30. With regards to claim 16, Komiyama et al., teach a method in which the concentration of exhaust gas is determined by a Fourier-transform infrared spectrometer (column 9 lines 15-18).

31. Claims 18 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Komiyama et al., (US 6,716,477) in view of Kim et al., (US 2003/0185966).

32. With regards to claim 18, Komiyama et al., teach a method of performing a predetermined process in a chamber containing a process target comprising main and sub exhaust means connected to the chamber for generating a vacuum (column 28 lines 1-9), and acquiring information about the exhaust gas flowing from the chamber (column 9 lines 15-18). Komiyama et al., do not teach sampling exhaust gas from a pipe located between the main and sub exhaust means. It would have been obvious to one of ordinary skill in the art at the time the

Art Unit: 1797

invention was made to modify Komiyama et al., in a manner where exhaust gasses between the main and sub exhaust sections is sampled in order to measure the content of the exhaust gas from various sections of the device as taught by Komiyama et al (column 28 lines 51-58). In addition, Komiyama et al., do not teach cleaning the inside of a chamber by supplying a cleaning gas, nor do they teach determining the pollution status inside the chamber and controlling the cleaning process based on information from the acquisition means. Kim et al., teach a method of cleaning a substrate processing chamber in which an energized cleaning gas is supplied to the chamber, and monitoring the cleaning process based on chemiluminescent radiation emitted from the chamber surface (claim 10 a, and c). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Komiyama et al., in view of Kim et al., to gain the advantage of improving chamber performance by preventing or removing accumulation of process residues on the chamber surface as taught by Kim et al.

33. With regards to claim 21, Komiyama et al., teach a method in which the first exhaust means is a turbo molecular pump, and the second exhaust means is a dry pump (column 10 lines 11-20).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dwan A. Gerido, Ph.D. whose telephone number is (571)270-3714. The examiner can normally be reached on Monday - Friday, 9:00 - 6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1797

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lyle A Alexander/
Primary Examiner, Art Unit 1797
DAG